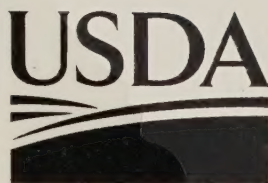


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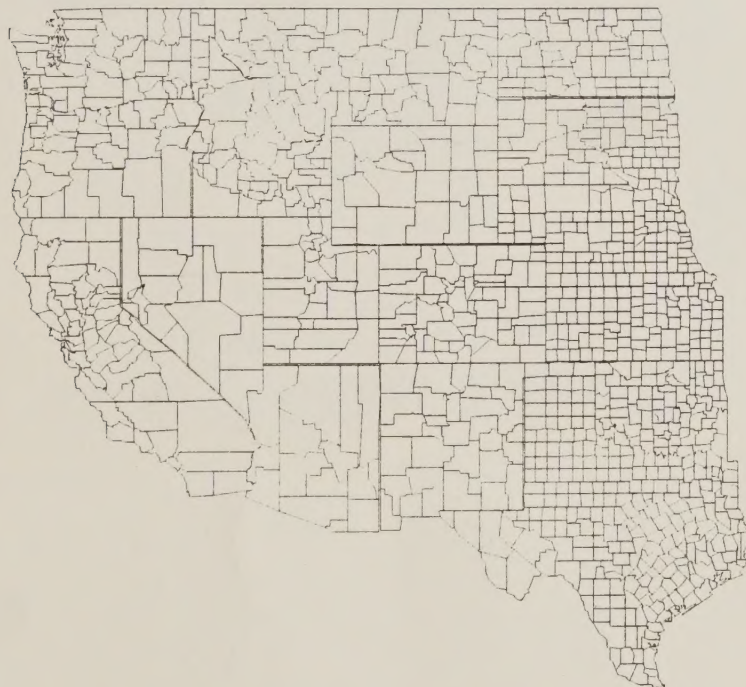


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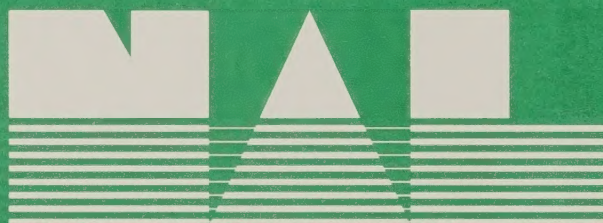
Economic Impact of the Russian Wheat Aphid and Greenbug in the Western United States 1993-94, 1994-95, and 1997-98



Compiled by James Webster, Ruth Treat,
Lisa Morgan, and Norm Elliott
USDA, ARS Plant Science and Water
Conservation Research Laboratory,
Stillwater, Oklahoma

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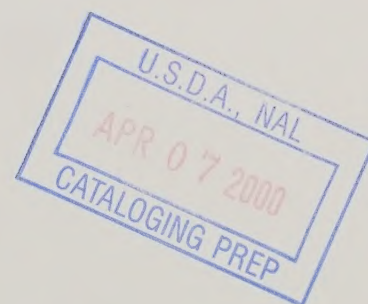
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Contributors:

Sue Blodgett, Montana State University
Mike Brewer, University of Wyoming
Leroy Brooks, Kansas State University
Phil Glogoza, North Dakota State University
Gary Hein, University of Nebraska
Lee Jackson, University of California
Greg Johnson, Montana State University
David Legg, University of Wyoming
Jerry Michels, Texas A&M University
Carl Patrick, Texas A&M University
Frank Peairs, Colorado State University
Keith Pike, Washington State University
Tom Royer, Oklahoma State University
Phil Sloderbeck, Kansas State University
Charles Summers, University of California
Mike Weiss, North Dakota State University



Introduction

The information contained in this report is the result of ongoing surveys of the economic impact of the Russian wheat aphid and greenbug in small grains. The report contains information from contributing states. The reporting format for 1994 and 1995 is consistent with that used in reports from earlier years. An abbreviated reporting format is used for 1998. Since not all states in which the two aphids are economic pests of small grains contributed information in all years, therefore the report is incomplete in its estimates of total economic impact. However, since detailed economic impact data were collected on the Russian wheat aphid each year from 1986 through 1993, this report contributes to that previous body of information, and to a similar, but smaller data base on economic impact of the greenbug. These surveys are important because they provide knowledge that is needed by decision makers at the research, administrative, and congressional levels.

Table 1. Wheat, barley, and other small grain acreage in Russian wheat aphid-infested areas in the western United States: 1994.

| State | | Dryland Wheat | Irrigated Wheat | Spring Wheat | Barley | Other Small Grains |
|-------------------------------------|--|--------------------------|------------------------|-------------------------|------------------------|-----------------------|
| Arizona | State acreage planted Acres in RWA-infested areas | 0 | 0 | 122,000 56,000 | 33,000 12,570 | 0 |
| Colorado | State acreage planted Acres in RWA-infested areas | 2,765,000 2,730,000 | 135,000 135,000 | 45,000 45,000 | 90,000 90,000 | 98,000 98,000 |
| Idaho | State acreage planted Acres in RWA-infested areas | 425,000 400,000 | 415,000 400,000 | 650,000 600,000 | 740,000 600,000 | 0 |
| Kansas | State acreage planted Acres in RWA-infested areas | 11,365,000 4,360,000 | 735,000 490,000 | 0 | 20,000 10,000 | 0 |
| Montana | State acreage planted Acres in RWA-infested areas | 2,600,000 0 | 27,500 0 | 2,742,000 0 | 2,100,000 0 | 162,500 0 |
| Nebraska | State acreage planted Acres in RWA-infested areas | 2,117,000 802,100 | 83,000 43,900 | 0 | 35,000 16,000 | 0 |
| North Dakota | State acreage planted Acres in RWA-infested areas | 35,000 6,000 | 0 | 9,000,000 175,000 | 2,600,000 38,000 | 3,200,000 7,000 |
| Oklahoma | State acreage planted Acres in RWA-infested areas | 7,015,000 600,500 | 160,000 135,500 | 0 | 0 | 0 |
| Oregon | State acreage planted Acres in RWA-infested areas | 800,000 669,000 | 100,000 100,000 | 65,000 56,000 | 140,000 131,000 | 0 |
| Texas | State acreage planted Acres in RWA-infested areas | 5,065,000 1,670,000 | 935,000 870,000 | 0 | 20,000 5,000 | 0 |
| Washington | State acreage planted Acres in RWA-infested areas | 2,400,000 2,000,000 | 0 | 250,000 245,000 | 310,000 305,000 | 45,000 30,000 |
| Total acreage Total in RWA areas | | 34,587,000 13,237,600 | 2,590,500 2,174,400 | 12,874,000 1,177,000 | 6,088,000 1,207,570 | 3,505,500 108,000 |

Table 2. Estimates of acres treated and cost of treatment for Russian wheat aphid in the western United States: fall 1993 and spring and summer 1994

| Winter Wheat | | | | | | | | | | | | | |
|--------------|---------|---------|-----------|--------|--------------|--------|--------|--------|--------------|--------|---------------------|---------|----------------------|
| State | Dryland | | Irrigated | | Spring Wheat | | Barley | | Small Grains | | Treatment cost/acre | | Total cost per state |
| | aerial | ground | aerial | ground | aerial | ground | aerial | ground | aerial | ground | aerial | ground | |
| Arizona | | | | | 4,000 | 0 | 2,000 | 0 | | | \$11.00 | N/A | \$66,000 |
| Colorado | 380,000 | 50,000 | 0 | 0 | 0 | 0 | 20,000 | 0 | 0 | 0 | \$10.50 | \$5.25 | \$4,462,500 |
| Idaho | 71,000 | 71,000 | 0 | 0 | 0 | 0 | 4,000 | 0 | | | \$12.00 | \$12.00 | \$1,752,000 |
| Kansas | 15,000 | 0 | 0 | 0 | | | 0 | 0 | | | \$8.45 | N/A | \$126,750 |
| Montana | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N/A | N/A | 0 |
| Nebraska | 0 | 0 | 0 | 2,000 | | | 0 | 0 | | | \$9.75 | \$9.25 | \$18,500 |
| North Dakota | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | N/A | N/A | 0 |
| Oklahoma | 51,000 | 0 | 19,000 | 0 | | | | | | | \$9.15 | N/A | \$640,500 |
| Oregon | 12,222 | 0 | 0 | 0 | 15,052 | 0 | 9,221 | 0 | | | \$7.00 | N/A | \$255,465 |
| Texas | 110,000 | 7,000 | 80,000 | 7,000 | | | 500 | 0 | | | \$8.20 | \$8.05 | \$1,674,800 |
| Washington | 50,000 | 0 | | | 10,000 | 0 | 0 | 0 | 0 | 0 | \$8.00 | N/A | \$480,000 |
| Totals | 689,222 | 128,000 | 99,000 | 9,000 | 29,052 | 0 | 35,721 | 0 | 0 | 0 | | | \$9,476,515 |

Table 3. Losses in dryland winter wheat attributed to Russian wheat aphid: 1994

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|--------------------------|---------------------|------------------|-------------------|-------------------|--------------|--------------|
| Arizona | | | | | | | 0 |
| Colorado | 650,000 | 31 | 20,150,000 | 10 | 2,015,000 | \$3.12 | \$6,286,800 |
| Idaho | 400,000 | 37 | 14,800,000 | 1 | 148,000 | \$3.90 | \$577,000 |
| Kansas | 4,108,000 | 35 | 143,780,000 | 0 | 0 | | 0 |
| Montana | 0 | | | | | | 0 |
| Nebraska | 754,000 | 35 | 26,407,500 | 0.1 | 26,410 | \$3.20 | \$84,504 |
| North Dakota | 0 | | | | | | 0 |
| Oklahoma | 734,200 | 29 | 21,291,800 | 15 | 3,193,770 | \$3.10 | \$9,990,687 |
| Oregon | 25,000 | 56 | 1,400,000 | 2 | 28,000 | \$4.00 | \$112,000 |
| Texas | 594,000 | 28 | 16,632,000 | 6 | 997,920 | \$3.05 | \$3,043,656 |
| Washington | 2,000,000 | 54 | 108,000,000 | 0.5 | 540,000 | \$4.10 | \$2,214,000 |
| Totals | 9,265,700 | | 352,443,800 | | 6,949,080 | | \$22,308,647 |

Table 4. Losses in irrigated winter wheat attributed to Russian wheat aphid: 1994

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|--------------------------|---------------------|------------------|-------------------|-------------------|--------------|--------------|
| Arizona | | | | | | | 0 |
| Colorado | 35,000 | 62 | 2,170,000 | 0 | 0 | \$3.12 | 0 |
| Idaho | 400,000 | 115 | 46,000,000 | 1 | 460,000 | \$3.90 | \$1,794,000 |
| Kansas | 480,000 | 52 | 24,960,000 | 0 | 0 | | 0 |
| Montana | 0 | | | | | | 0 |
| Nebraska | 37,200 | 55 | 2,046,000 | 0 | 0 | \$3.20 | 0 |
| North Dakota | | | | | | | 0 |
| Oklahoma | 135,500 | 59 | 7,994,500 | 15 | 119,175 | \$3.10 | \$3,717,443 |
| Oregon | 5,000 | 100 | 500,000 | 1 | 5,000 | \$4.00 | \$20,000 |
| Texas | 696,000 | 55 | 38,280,000 | 4 | 1,531,200 | \$3.05 | \$4,670,160 |
| Washington | | | | | | | 0 |
| Totals | 1,788,700 | | 121,950,500 | | 3,195,375 | | \$10,201,603 |

Table 5. Losses in spring wheat attributed to Russian wheat aphid: 1994

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|-------------------------------------|--------------------------------|-----------------------------|------------------------------|------------------------------|-------------------------|-----------------------|
| Arizona | 56,000 | 92.5 | 5,180,000 | 0 | 0 | \$3.90 | 0 |
| Colorado | 4,500 | 82 | 369,000 | 0 | 0 | \$3.12 | 0 |
| Idaho | 600,000 | 75 | 45,000,000 | 1 | 450,000 | \$3.55 | \$1,597,500 |
| Kansas | | | | | | | 0 |
| Montana | 0 | | | | | | 0 |
| Nebraska | | | | | | | 0 |
| North Dakota | 0 | | | | | | 0 |
| Oklahoma | | | | | | | 0 |
| Oregon | 22,000 | 38 | 836,000 | 4 | 33,440 | \$4.00 | \$133,760 |
| Texas | | | | | | | 0 |
| Washington | 305,000 | 47 | 14,335,000 | 0.5 | 71,675 | \$4.30 | \$308,203 |
| Totals | 987,500 | | 65,720,000 | | 555,115 | | \$2,039,463 |

Table 6. Losses in barley attributed to Russian wheat aphid: 1994

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|-----------------------------|------------------------|---------------------|----------------------|----------------------|-----------------|---------------|
| Arizona | 12,570 | 95 | 1,194,150 | 0 | 0 | \$2.60 | 0 |
| Colorado | 25,000 | 82 | 2,050,000 | 5 | 102,500 | \$2.72 | \$278,800 |
| Idaho | 600,000 | 90 | 54,000,000 | 1 | 540,000 | \$1.92 | \$1,036,800 |
| Kansas | 0 | | | | | | 0 |
| Montana | 0 | | | | | | 0 |
| Nebraska | 0 | | | | | | 0 |
| North Dakota | 0 | | | | | | 0 |
| Oklahoma | | | | | | | 0 |
| Oregon | 11,000 | 65 | 715,000 | 2 | 14,300 | \$1.95 | \$27,885 |
| Texas | 2,000 | 40 | 80,000 | 2 | 1,600 | \$1.83 | \$2,928 |
| Washington | 305,000 | 47 | 14,335,000 | 0.5 | 71,675 | \$1.95 | \$139,766 |
| Totals | 955,570 | | 72,374,150 | | 730,075 | | \$1,486,179 |

Russian Wheat Aphid: 1994 - 95

Table 1. Wheat, barley, and other small grain acreage in Russian wheat aphid-infested areas in the western United States: 1995. Parenthetical numbers indicate percentage of Russian wheat aphid-infested acres.

| State | <u>Winter Wheat</u> | | | | | Other Small Grains |
|--------------|---------------------|----------------|-----------------|------------------|--|--------------------|
| | Dryland | Irrigated | Spring Wheat | Barley | | |
| Colorado | 2,765,000 (100) | 145,000 (100) | 40,000 (25) | 110,000 (27.3) | | 110,000 (81.8) |
| Idaho | 500,000 (100) | 290,000 (100) | 650,000 (100) | 740,000 (100) | | 170,000 (100) |
| Kansas | 10,900,000 (2.75) | 800,000 (2.5) | 0 | 0 | | 0 |
| Montana | 1,713,000 (31.5) | 30,000 (10.3) | 3,450,000 (9.4) | 1,300,000 (25.2) | | 0 |
| Nebraska | 2,053,000 (38.3) | 97,000 (55.2) | 0 | 8,000 (42.5) | | 0 |
| New Mexico | 307,700 (100) | 156,300 (100) | <10,000 (0) | <7,000 (0) | | <10,000 (0) |
| North Dakota | 0 | 0 | 0 | 0 | | 0 |
| Oklahoma | 6,740,000 (12.2) | 160,000 (90.6) | 0 | 6,000 (25) | | 0 |
| Washington | 2,400,000 (41.7) | 0 | 250,000 (50) | 310,000 (32.3) | | 45,000 (0) |

Table 2. Estimates of acres treated and cost of treatment for Russian wheat aphid in the western United States: 1995

| <u>Winter Wheat</u> | | | | | | | | | | | | | Total cost per state |
|---------------------|----------------|--------|------------------|--------|---------------------|--------|---------------|--------|-------------------------|--------|--------------------------------|---------|-------------------------|
| State | <u>Dryland</u> | | <u>Irrigated</u> | | <u>Spring Wheat</u> | | <u>Barley</u> | | <u>Small Grains</u> | | <u>Treatment cost/acre</u> | | |
| | aerial | ground | aerial | ground | aerial | ground | aerial | ground | aerial | ground | aerial | ground | |
| Colorado | 220,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | \$11.00 | N/A | \$2,420,000 |
| Idaho | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N/A | N/A | 0 |
| Kansas | 0 | 0 | 0 | 0 | | | | | | | N/A | N/A | 0 |
| Montana | 2,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | \$11.00 | \$10.50 | \$22,000 |
| Nebraska | 0 | 4,000 | 0 | 0 | | | 0 | 0 | | | N/A | \$9.35 | \$37,400 |
| New Mexico | 5,000 | 3,000 | 6,000 | 4,000 | 0 | 0 | 0 | 0 | 0 | 0 | \$10.75 | \$9.75 | \$186,500 |
| North Dakota | | | | | | | | | | | N/A | N/A | 0 |
| Oklahoma | 10,700 | 0 | 0 | 0 | | | 0 | 0 | | | \$11.00 | N/A | \$117,000 |
| Washington | 5,000 | 0 | | | 25,000 | 5,000 | 0 | 0 | 0 | 0 | \$9.00 | \$9.00 | \$315,000 |

Table 3. Losses in dryland winter wheat attributed to Russian wheat aphid: 1995

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|-----------------------------|------------------------|---------------------|----------------------|----------------------|-----------------|---------------|
| Colorado | 2,565,000 | 38 | 97,470,000 | 0 | 0 | \$4.60 | 0 |
| Idaho | 500,000 | 52.1 | 26,050,000 | 0 | 0 | \$3.60 | 0 |
| Kansas | 232,000 | 38 | 8,816,000 | 0 | 0 | \$4.55 | 0 |
| Montana | 539,300 | 31 | 16,718,300 | 1 | 167,183 | \$4.25 | \$710,528 |
| Nebraska | 193,000 | 34 | 6,562,000 | 1 | 65,620 | \$4.50 | \$295,290 |
| New Mexico | 85,500 | 6.4 | 547,200 | 1 | 5,472 | \$4.40 | \$24,077 |
| North Dakota | | | | | | | 0 |
| Oklahoma | 463,000 | 20.8 | 9,630,400 | 0 | 0 | \$4.35 | 0 |
| Washington | 1,000,000 | 54 | 54,000,000 | 0.5 | 270,000 | \$3.95 | \$1,066,500 |

Table 4. Losses in irrigated winter wheat attributed to Russian wheat aphid: 1995

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|--------------------------|---------------------|------------------|-------------------|-------------------|--------------|------------|
| Colorado | 135,000 | 62 | 8,370,000 | 0 | 0 | \$4.60 | 0 |
| Idaho | 290,500 | 106.2 | 30,851,100 | 0 | 0 | \$3.85 | 0 |
| Kansas | 19,000 | 52 | 988,000 | 0 | 0 | \$4.55 | 0 |
| Montana | 3,100 | 58 | 179,800 | 0 | 0 | \$4.25 | 0 |
| Nebraska | 52,000 | 63.4 | 3,296,800 | 0 | 0 | \$4.50 | 0 |
| New Mexico | 64,500 | 42.7 | 2,754,150 | 1 | 27,542 | \$4.40 | \$121,183 |
| North Dakota | | | | | | | 0 |
| Oklahoma | 107,000 | 29 | 3,103,000 | 0 | 0 | \$4.35 | 0 |
| Washington | | | | | | | 0 |

Table 5. Losses in spring wheat attributed to the Russian wheat aphid: 1995

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|-----------------------------|------------------------|---------------------|----------------------|----------------------|-----------------|---------------|
| Colorado | 19,500 | 70 | 1,365,000 | 0 | 0 | \$4.45 | 0 |
| Idaho | 650,000 | 70 | 45,500,000 | 0 | 0 | \$3.70 | 0 |
| Kansas | | | | | | | 0 |
| Montana | 324,500 | 65 | 21,092,500 | 0 | 0 | \$4.40 | 0 |
| Nebraska | | | | | | | 0 |
| New Mexico | | | | | | | 0 |
| North Dakota | | | | | | | 0 |
| Oklahoma | | | | | | | 0 |
| Washington | 115,000 | 40 | 4,600,000 | 4 | 184,000 | \$3.95 | \$726,800 |

Table 6. Losses in barley attributed to Russian wheat aphid: 1995

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|--------------------------|---------------------|------------------|-------------------|-------------------|--------------|------------|
| Colorado | 28,500 | 100 | 2,850,000 | 0 | 0 | \$3.05 | 0 |
| Idaho | 740,000 | 75 | 55,500,000 | 0 | 0 | \$2.40 | 0 |
| Kansas | | | | | | | 0 |
| Montana | 326,900 | 75 | 24,517,500 | 0 | 0 | \$2.51 | 0 |
| Nebraska | 2,700 | 41 | 110,700 | 0 | 0 | \$2.15 | 0 |
| New Mexico | | | | | | | 0 |
| North Dakota | | | | | | | 0 |
| Oklahoma | 700 | 30 | 21,000 | 0 | 0 | \$2.20 | 0 |
| Washington | 100,000 | 47 | 4,700,000 | 0.3 | 14,100 | \$2.00 | \$28,200 |

Table 7. Losses in other small grains attributed to Russian wheat aphid: 1995

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|-----------------------------|------------------------|---------------------|----------------------|----------------------|-----------------|---------------|
| Colorado | 85,500 | 55 | 4,702,500 | 0 | 0 | \$2.05 | 0 |
| Idaho | 170,000 | 56 | 9,520,000 | 0 | 0 | | 0 |
| Kansas | | | | | | | 0 |
| Montana | | | | | | | 0 |
| Nebraska | | | | | | | 0 |
| New Mexico | | | | | | | 0 |
| North Dakota | | | | | | | 0 |
| Oklahoma | | | | | | | 0 |
| Washington | 45,000 | 58 | 2,610,000 | 0 | 0 | \$1.30 | 0 |

Greenbug: 1994 - 95

Table 1. Wheat, barley, and other small grain acreage in Greenbug-infested areas in the western United States: 1995. Parenthetical numbers indicate percentage of Greenbug-infested acres.

| State | <u>Winter Wheat</u> | | | | | |
|--------------|---------------------|----------------|---------------|---------------|--------------------|----------------|
| | Dryland | Irrigated | Spring Wheat | Barley | Other Small Grains | Sorghum |
| Colorado | 2,765,000 (0) | 145,000 (0) | 40,000 (0) | 110,000 (0) | 110,000 (0) | 0 |
| Idaho | 500,000 (100) | 290,000 (100) | 650,000 (100) | 740,000 (100) | 170,000 (100) | 0 |
| Kansas | 10,900,000 (2.78) | 800,000 (5.3) | 0 | 0 | 0 | 0 |
| Montana | 1,713,000 (0) | 30,000 (0) | 3,450,000 (0) | 1,300,000 (0) | 0 | 0 |
| Nebraska | 2,053,000 (0.5) | 97,000 (1.03) | 0 | 8,000 (0) | 0 | 980,000 (61.2) |
| New Mexico | 307,700 (100) | 156,300 (93.6) | <10,000 (0) | <7,000 (0) | <10,000 (0) | 0 |
| North Dakota | 50,000 (0) | 0 | 9,300,000 (0) | 2,700,000 (0) | 3,400,000 (0) | 0 |
| Oklahoma | 6,740,000 (93.3) | 160,000 (99.7) | 0 | 6,000 (100) | 0 | 350,000 (86) |
| Washington | 2,400,000 (0) | 0 | 250,000 (0) | 310,000 (0) | 45,000 (0) | 0 |

Table 3. Losses in dryland winter wheat attributed to Greenbug: 1995

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|-------------------------------------|--------------------------------|-----------------------------|------------------------------|------------------------------|-------------------------|-----------------------|
| Colorado | 0 | | | | | | 0 |
| Idaho | 400,000 | 52.1 | 20,840,000 | 0.5 | 104,200 | \$3.60 | \$375,120 |
| Kansas | 263,000 | 38 | 9,994,000 | 5 | 499,700 | \$4.55 | \$2,273,635 |
| Montana | | | | | | | |
| Nebraska | 10,000 | 40.9 | 409,000 | 0 | 0 | \$4.50 | 0 |
| New Mexico | 85,500 | 6.4 | 547,200 | 0 | 0 | \$4.40 | 0 |
| North Dakota | | | | | | | 0 |
| Oklahoma | 4,870,500 | 20.8 | 101,306,400 | 0 | 0 | \$4.35 | 0 |
| Washington | | | | | | | 0 |

Table 4. Losses in irrigated winter wheat attributed to Greenbug: 1995

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|--------------------------|---------------------|------------------|-------------------|-------------------|--------------|--------------|
| Colorado | 0 | | | | | | 0 |
| Idaho | 290,500 | 106.2 | 30,851,100 | 0 | 0 | \$3.85 | 0 |
| Kansas | 39,800 | 52 | 2,069,600 | 5 | 130,480 | \$4.55 | \$47,083,400 |
| Montana | | | | | | | 0 |
| Nebraska | 1,000 | 63.4 | 63,400 | 0 | 0 | \$4.50 | 0 |
| New Mexico | 54,500 | 42.7 | 2,327,150 | 0 | 0 | \$4.40 | 0 |
| North Dakota | | | | | | | 0 |
| Oklahoma | 119,000 | 29 | 3,451,000 | 0 | 0 | \$4.35 | 0 |
| Washington | | | | | | | 0 |

Table 5. Losses in spring wheat attributed to Greenbug: 1995

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|-----------------------------|------------------------|---------------------|----------------------|----------------------|-----------------|---------------|
| Colorado | | | | | | | 0 |
| Idaho | 650,000 | 70 | 45,500,000 | 0 | 0 | \$3.70 | 0 |
| Kansas | | | | | | | 0 |
| Montana | | | | | | | 0 |
| Nebraska | | | | | | | 0 |
| New Mexico | | | | | | | 0 |
| North Dakota | | | | | | | 0 |
| Oklahoma | | | | | | | 0 |
| Washington | | | | | | | 0 |

Table 6. Losses in barley attributed to Greenbug: 1995

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|-----------------------------|------------------------|---------------------|----------------------|----------------------|-----------------|---------------|
| Colorado | | | | | | | 0 |
| Idaho | 740,000 | 75 | 55,500,000 | 0 | 0 | \$2.40 | 0 |
| Kansas | | | | | | | 0 |
| Montana | | | | | | | 0 |
| Nebraska | | | | | | | 0 |
| New Mexico | | | | | | | 0 |
| North Dakota | | | | | | | 0 |
| Oklahoma | 3,000 | 30 | 90,000 | 0 | 0 | \$2.20 | 0 |
| Washington | | | | | | | 0 |

Table 7. Losses in other small grains attributed to Greenbug: 1995

| State | Infested acres harvested | Yield per acre (bu) | Total yield (bu) | % yield reduction | Yield losses (bu) | Value per bu | Total loss |
|--------------|-----------------------------|------------------------|---------------------|----------------------|----------------------|-----------------|---------------|
| Colorado | | | | | | | 0 |
| Idaho | 170,000 | 56 | 9,520,000 | 0 | 0 | | 0 |
| Kansas | | | | | | | 0 |
| Montana | | | | | | | 0 |
| Nebraska | 600,000 | 80 | 48,000,000 | 5 | 2,400,000 | \$3.08 | \$7,392,000 |
| New Mexico | | | | | | | 0 |
| North Dakota | | | | | | | 0 |
| Oklahoma | 233,900 | 34.8 | 16,279,440 | 0 | 0 | \$5.90 | 0 |
| Washington | | | | | | | 0 |

Russian Wheat Aphid: 1997 - 98

Table 1. Economic impact of the Russian wheat aphid on dryland winter wheat in reporting states, 1997-1998 growing season.

| State | Infestation severity rating | Counties where: | | | Acres Planted | Acres in infested area | Acres infested | % yield loss | Acres treated |
|--------------|-----------------------------|-----------------|---------------|-----------------|---------------|------------------------|----------------|--------------|---------------|
| | | Crop Planted | RWAs Detected | Economic Losses | | | | | |
| California | NA | 0 | NA | NA | 0 | NA | NA | NA | no info. |
| Colorado | none | 37 | 3 | 0 | 2,690,000 | 218,000 | 0 | 0 | no info. |
| Kansas | none | 105 | 0 | 0 | 10,091,000 | 0 | 0 | 0 | no info. |
| Montana | low | 48 | 22 | 0 | 1,414,000 | 0 | 0 | 0 | no info. |
| North Dakota | none | 27 | 0 | 0 | 70,000 | 0 | 0 | 0 | no info. |
| Nebraska | low | 47 | 12 | 2 | 1,800,000 | 460,000 | 46,000 | 0.06 | no info. |
| Oklahoma | low | 77 | 4 | 1 | 5,400,000 | 280,000 | 28,000 | 0.01 | no info. |
| Wyoming | low | -- | -- | -- | 230,000 | 230,000 | 230,000 | 2.0 | 1,000 |

Notes:

Acres in infested area = (# counties where RWAs detected / # counties where crop planted) x acres planted

Acres infested = Acres in infested area x C1.

% Yield loss = ((Acres infested x C2) / acres planted)) x 100

The Constants C1 and C2 are:

| Rating | C1 | C2 |
|----------|------|-------|
| none | 0.00 | 0.00 |
| low | 0.10 | 0.025 |
| moderate | 0.50 | 0.05 |
| severe | 1.00 | 0.10 |

Table 2. Economic impact of the Russian wheat aphid on irrigated winter wheat in reporting states, 1997-1998 growing season.

| State | Infestation severity rating | Counties where: | | | Acres Planted | Acres in infested area | Acres infested | % yield loss | Acres treated |
|--------------|-----------------------------|-----------------|---------------|-----------------|---------------|------------------------|----------------|--------------|---------------|
| | | Crop Planted | RWAs Detected | Economic Losses | | | | | |
| California | NA | 0 | NA | NA | 0 | NA | NA | NA | NA |
| Colorado | none | 26 | 0 | 0 | 160,000 | 0 | 0 | 0 | no info. |
| Kansas | none | 43 | 0 | 0 | 609,000 | 0 | 0 | 0 | no info. |
| Montana | low | 39 | 5 | | 33,000 | 4,200 | 420 | 0.03 | no info. |
| North Dakota | NA | 0 | NA | NA | 0 | NA | NA | NA | no info. |
| Nebraska | none | 18 | 9 | 0 | 100,000 | 50,000 | 0 | 0 | no info. |
| Oklahoma | low | 14 | 4 | 0 | 120,000 | 34,000 | 3,400 | 0.07 | no info. |
| Wyoming | no info. | no info. | no info. | no info. | no info. | no info. | NA | NA | NA |

Notes:

Acres in infested area = (# counties where RWAs detected / # counties where

crop planted) x acres planted

Acres infested = Acres in infested area x C1.

% Yield loss = ((Acres infested x C2) / acres planted)) x 100

The Constants C1 and C2 are:

| Rating | C1 | C2 |
|----------|------|-------|
| none | 0.00 | 0.00 |
| low | 0.10 | 0.025 |
| moderate | 0.50 | 0.05 |
| severe | 1.00 | 0.10 |

Table 3. Economic impact of the Russian wheat aphid on spring wheat in reporting states, 1997-1998 growing season.

| State | Infestation severity rating | Counties where: | | | Acres Planted | Acres in infested area | Acres infested | % yield loss | Acres treated |
|--------------|-----------------------------|-----------------|---------------|-----------------|---------------|------------------------|----------------|--------------|---------------|
| | | Crop Planted | RWAs Detected | Economic Losses | | | | | |
| California | low | 33 | 25 | 0 | 670,000 | 507,000 | 50,750 | 0.2 | NA |
| Colorado | none | 17 | 1 | 0 | 70,000 | 4,100 | 0 | 0 | no info. |
| Kansas | NA | 0 | NA | NA | 0 | NA | NA | NA | NA |
| Montana | low | 52 | 22 | no info. | 4,640,000 | 1,900,000 | 190,000 | 0.1 | no info. |
| North Dakota | none | 53 | 0 | 0 | 8,800,000 | 0 | 0 | 0 | no info. |
| Nebraska | NA | 0 | NA | NA | 0 | NA | NA | NA | NA |
| Oklahoma | NA | 0 | NA | NA | 0 | NA | NA | NA | NA |
| Wyoming | no info. | no info. | no info. | no info. | no info. | no info. | NA | NA | NA |

Notes:

Acres in infested area = (# counties where RWAs detected / # counties where crop planted) x acres planted

Acres infested = Acres in infested area x C1.

% Yield loss = ((Acres infested x C2) / acres planted)) x 100

The Constants C1 and C2 are:

| Rating | C1 | C2 |
|----------|------|-------|
| none | 0.00 | 0.00 |
| low | 0.10 | 0.025 |
| moderate | 0.50 | 0.05 |
| severe | 1.00 | 0.10 |

Table 4. Economic impact of the Russian wheat aphid on barley in reporting states, 1997-1998 growing season.

| State | Infestation severity rating | Counties where: | | | Acres Planted | Acres in infested area | Acres infested | % yield loss | Acres treated |
|--------------|-----------------------------|-----------------|---------------|-----------------|---------------|------------------------|----------------|--------------|---------------|
| | | Crop Planted | RWAs Detected | Economic Losses | | | | | |
| California | low | 33 | 25 | 0 | 220,000 | 167,000 | 16,700 | 0.19 | NA |
| Colorado | low | 27 | 4 | 0 | 95,000 | 15,200 | 1,520 | 0.04 | no info. |
| Kansas | none | no info. | 0 | 0 | 10,000 | 0 | 0 | 0 | NA |
| Montana | low | 54 | 14 | no info. | 1,300,000 | 337,000 | 33,700 | 0.06 | no info. |
| North Dakota | none | 53 | 0 | 0 | 2,400,00 | 0 | 0 | 0 | NA |
| Nebraska | low | 8 | 5 | 2 | 10,000 | 6,250 | 625 | 0.16 | NA |
| Oklahoma | NA | 0 | 0 | 0 | 0 | NA | NA | NA | NA |
| Wyoming | -- | -- | -- | -- | 105,000 | 105,000 | -- | 2.0 | NA |

Notes:

Acres in infested area = (# counties where RWAs detected / # counties where crop planted) x acres planted

Acres infested = Acres in infested area x C1.

% Yield loss = ((Acres infested x C2) / acres planted)) x 100

The Constants C1 and C2 are:

| Rating | C1 | C2 |
|----------|------|-------|
| none | 0.00 | 0.00 |
| low | 0.10 | 0.025 |
| moderate | 0.50 | 0.05 |
| severe | 1.00 | 0.10 |

Greenbug: 1997 - 98

Table 1. Economic impact of the Greenbug on dryland winter wheat in reporting states, 1997-1998 growing season.

| State | Infestation severity rating | Counties where: | | | Acres Planted | Acres in infested area | Acres infested | % yield loss | Acres treated |
|--------------|-----------------------------|-----------------|--------------------|-----------------|---------------|------------------------|----------------|--------------|---------------|
| | | Crop Planted | Greenbugs Detected | Economic Losses | | | | | |
| California | NA | 0 | NA | NA | 0 | NA | NA | NA | NA |
| Colorado | no info. | 37 | no info. | no info. | 2,690,000 | no info. | no info. | no info. | no info. |
| Kansas | low | 105 | 105 | 0 | 10,091,000 | 10,091,000 | 1,009,100 | 0.25 | no info. |
| Montana | no info. | 48 | no info. | no info. | 1,417,000 | no info. | no info. | no info. | no info. |
| Nebraska | none | 47 | no info. | 0 | 1,800,000 | no info. | no info. | no info. | no info. |
| North Dakota | low | 27 | 12 | 0 | 70,000 | 31,100 | 3,100 | 0.1 | no info. |
| Oklahoma | low | 77 | 40 | 5 | 5,400,000 | 2,800,000 | 280,000 | 1.2 | no info. |
| Wyoming | -- | -- | -- | -- | 230,000 | 230,000 | 2,300 | 0.0 | no info. |

Notes:

Acres in infested area = (# counties where RWAs detected / # counties where

crop planted) x acres planted

Acres infested = Acres in infested area x C1.

% Yield loss = ((Acres infested x C2) / acres planted)) x 100

The Constants C1 and C2 are:

| Rating | C1 | C2 |
|----------|------|-------|
| none | 0.00 | 0.00 |
| low | 0.10 | 0.025 |
| moderate | 0.50 | 0.05 |
| severe | 1.00 | 0.10 |

Table 2. Economic impact of the Greenbug on irrigated winter wheat in reporting states, 1997-1998 growing season.

| State | Infestation severity rating | Counties where: | | | | Acres Planted | Acres in infested area | Acres infested | % yield loss | Acres treated |
|--------------|-----------------------------|-----------------|--------------------|-----------------|----------|---------------|------------------------|----------------|--------------|---------------|
| | | Crop Planted | Greenbugs Detected | Economic Losses | | | | | | |
| California | NA | 0 | NA | NA | 0 | 0 | NA | NA | NA | NA |
| Colorado | no info. | 26 | no info. | no info. | 160,000 | 160,000 | no info. | no info. | no info. | no info. |
| Kansas | low | 43 | 43 | 0 | 609,000 | 609,000 | 609,000 | 0.25 | no info. | no info. |
| Montana | no info. | 39 | no info. | no info. | 33,000 | 33,000 | no info. | no info. | no info. | no info. |
| Nebraska | none | 18 | no info. | 0 | 100,000 | 100,000 | no info. | no info. | no info. | no info. |
| North Dakota | none | 0 | NA | NA | 0 | 0 | NA | NA | NA | no info. |
| Oklahoma | low | 14 | 4 | no info. | 120,000 | 120,000 | 34,000 | 0.07 | no info. | no info. |
| Wyoming | no info. | no info. | no info. | no info. | no info. | no info. | no info. | no info. | no info. | no info. |

Notes:

Acres in infested area = (# counties where RWAs detected / # counties where

crop planted) x acres planted

Acres infested = Acres in infested area x C1.

% Yield loss = ((Acres infested x C2) / acres planted)) x 100

The Constants C1 and C2 are:

| Rating | C1 | C2 |
|----------|------|-------|
| none | 0.00 | 0.00 |
| low | 0.10 | 0.025 |
| moderate | 0.50 | 0.05 |
| severe | 1.00 | 0.10 |

Table 3. Economic impact of the Greenbug on spring wheat in reporting states, 1997-1998 growing season.

| State | Infestation severity rating | Counties where: | | | | Acres in infested area | Acres Planted | Acres infested | % yield loss | Acres treated |
|--------------|-----------------------------|-----------------|--------------------|-----------------|--|------------------------|---------------|----------------|--------------|---------------|
| | | Crop Planted | Greenbugs Detected | Economic Losses | | | | | | |
| California | low | 33 | 12 | 0 | | 250,000 | 690,000 | 25,000 | 0.09 | no info. |
| Colorado | no info. | 17 | no info. | no info. | | no info. | 70,000 | no info. | no info. | no info. |
| Kansas | NA | 0 | NA | NA | | NA | 0 | NA | NA | NA |
| Montana | no info. | 52 | no info. | no info. | | no info. | 4,640,000 | no info. | no info. | no info. |
| Nebraska | NA | 0 | NA | NA | | NA | 0 | NA | NA | NA |
| North Dakota | none | 53 | 23 | 0 | | 0 | 8,800,000 | 0 | 0 | no info. |
| Oklahoma | NA | 0 | NA | NA | | NA | 0 | NA | NA | NA |
| Wyoming | no info. | no info. | no info. | no info. | | no info. | no info. | NA | NA | NA |

Notes:

Acres in infested area = (# counties where RWAs detected / # counties where crop planted) x acres planted

Acres infested = Acres in infested area x C1.

% Yield loss = ((Acres infested x C2) / acres planted)) x 100

The Constants C1 and C2 are:

| Rating | C1 | C2 |
|----------|------|-------|
| none | 0.00 | 0.00 |
| low | 0.10 | 0.025 |
| moderate | 0.50 | 0.05 |
| severe | 1.00 | 0.10 |

Table 4. Economic impact of the Greenbug on barley in reporting states, 1997-1998 growing season.

| State | Infestation severity rating | Counties where: | | | Acres Planted | Acres in infested area | Acres infested | % yield loss | Acres treated |
|--------------|-----------------------------|-----------------|--------------------|-----------------|---------------|------------------------|----------------|--------------|---------------|
| | | Crop Planted | Greenbugs Detected | Economic Losses | | | | | |
| California | low | 33 | 12 | 0 | 220,000 | 80,000 | 8,000 | 0.09 | no info. |
| Colorado | no info. | 27 | no info. | no info. | 95,000 | no info. | no info. | no info. | no info. |
| Kansas | low | no info. | no info. | 0 | 10,000 | no info. | no info. | no info. | no info. |
| Montana | no info. | 54 | no info. | no info. | 1,300,000 | no info. | no info. | no info. | no info. |
| Nebraska | none | 8 | no info. | 0 | 10,000 | no info. | no info. | no info. | no info. |
| North Dakota | none | 53 | 23 | 0 | 2,400,000 | no info. | no info. | no info. | no info. |
| Oklahoma | NA | 0 | NA | NA | 0 | NA | NA | NA | NA |
| Wyoming | no info. | no info. | no info. | no info. | 105,000 | no info. | no info. | no info. | no info. |

Notes:

Acres in infested area = (# counties where RWAs detected / # counties where crop planted) x acres planted

Acres infested = Acres in infested area x C1.

% Yield loss = ((Acres infested x C2) / acres planted)) x 100

The Constants C1 and C2 are:

| Rating | C1 | C2 |
|----------|------|-------|
| none | 0.00 | 0.00 |
| low | 0.10 | 0.025 |
| moderate | 0.50 | 0.05 |
| severe | 1.00 | 0.10 |

Table 5. Economic impact of the Greenbug on sorghum in reporting states, 1997-1998 growing season.

| State | Infestation severity rating | Counties where: | | | | Acres Planted | Acres in infested area | Acres infested | % yield loss | Acres treated |
|--------------|-----------------------------|-----------------|--------------------|-----------------|-----------|---------------|------------------------|----------------|--------------|---------------|
| | | Crop Planted | Greenbugs Detected | Economic Losses | | | | | | |
| California | NA | 0 | NA | NA | 0 | NA | NA | NA | NA | NA |
| Colorado | no info. | 21 | no info. | no info. | 290,000 | no info. | no info. | no info. | no info. | no info. |
| Kansas | low | 105 | 105 | 0 | 3,500,000 | 3,500,000 | 87,500 | 2.5 | no info. | no info. |
| Montana | NA | 0 | NA | NA | 0 | NA | NA | NA | NA | NA |
| Nebraska | none | 35 | no info. | 0 | 900,000 | no info. | no info. | no info. | no info. | no info. |
| North Dakota | NA | 0 | NA | NA | 0 | NA | NA | NA | NA | NA |
| Oklahoma | low | 62 | 45 | 5 | 490,000 | 355,000 | 36,000 | 0.18 | no info. | no info. |
| Wyoming | NA | 0 | NA | NA | 0 | NA | NA | NA | NA | NA |

Notes:

Acres in infested area = (# counties where RWAs detected / # counties where crop planted) x acres planted

Acres infested = Acres in infested area x C1.

% Yield loss = ((Acres infested x C2) / acres planted)) x 100

The Constants C1 and C2 are:

| Rating | C1 | C2 |
|----------|------|-------|
| none | 0.00 | 0.00 |
| low | 0.10 | 0.025 |
| moderate | 0.50 | 0.05 |
| severe | 1.00 | 0.10 |





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